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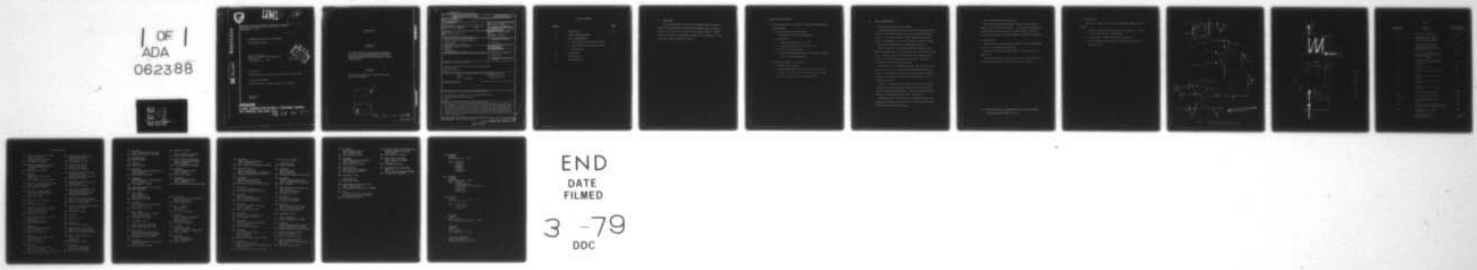

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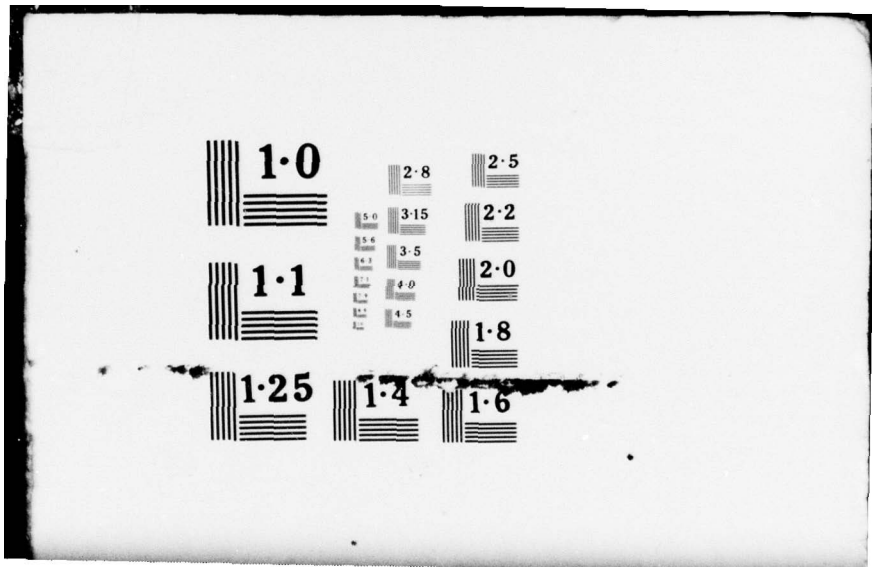
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RESEARCH AND DEVELOPMENT TECHNICAL REPORT
CORADCOM- 76-0332-7

ELECTROMAGNETIC RADIATION SYSTEM (EMRS)

SUSCEPTIBILITY TESTING

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November 1978

Quarterly Report for Period of 1 April 1978 to 30 June 1978

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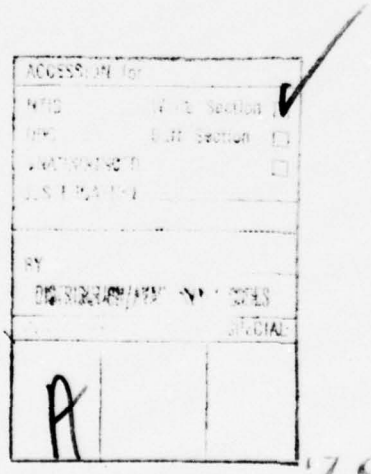

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The function of the Electromagnetic Radiation System (EMRS) is to generate electromagnetic energy so as to produce a constant field strength that can be automatically scanned as a function of frequency. The design objective is to cover the frequency range of 30 hertz to 40 gigahertz with field strength intensities up to 200 volts per meter. The status of system hardware is described along with considerations of modulation circuitry, power leveling and control panel design.

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I. INTRODUCTION.

This report describes the activities and developments concerning Phase II of Electromagnetic Radiation System (EMRS) Program during the period 1 April 1978 to 30 June 1978. The purpose of Phase II of EMRS program is to develop the hardware to demonstrate the feasibility of the theoretical design considered in Phase I.

II. STATUS OF EMRS EQUIPMENT.

A. During the period of this report, the following equipment has been received:

1. Sweep Oscillator system including:

   a. HP 86235A 1.7 to 4.3 GHz RF plug-in.

2. RF amplifiers

   a. Logimetrics A600L for 1 to 2.1 GHz

   b. Logimetrics A200U for 12.4 to 18.0 GHz

3. RF power leveling and controls

   a. HP8495H programmable attenuator for attenuating the RF input to the crystal detector.

B. Remaining equipment to be received:

1. Tunable bandpass filters.

   The tunable bandpass filters for the 30 to 60 MHz, 1 to 2.1 GHz, 2.1 to 4 GHz, and 12.4 to 18 GHz are on order. Delivery is expected in early September 1978.

III. DESIGN CONSIDERATIONS.

A. Pulse and fast AM modulation circuit.

Design and preliminary testing of the fast AM and pulse modulation circuit has been completed. The circuit diagram is shown in figure 1. The circuit consists of input channels for selecting either pulse modulation or fast AM. Selection is made by setting a control panel toggle switch to either PULSE or FAST AM.

With the switch, S1, in the PULSE position the output of the DH0035 PIN diode driver is connected, via S1C, to the pin diode modulator. The inputs to the PIN diode driver are connected, via S1A and S1B, to the DS8830 differential line driver. The input to the DS8830 is the pulse modulation signal.

With switch S1 in the FAST AM position, the PIN diode is connected to the output of the BB3554 high speed/current AM driver. The input to AM driver is the desired modulating signal. Resistor R1 adjust, the output offset voltage of the AM driver to set the pin diode bias point.

Results of preliminary tests indicate that the pulse modulator is capable of modulating the pin diode with pulse rise and fall times of less than 100 nanoseconds. Test of the AM driver circuit indicates 100% modulation up to 2 MHz is achieveable.

Addition test will be performed on the modulator after final packaging to determine the effects of stray capacitance on modulation band width and pulse rise time.

B. Power setting and leveling circuitry.

The design of the power setting and leveling circuitry was discussed in the 6th quarterly report[1]. The circuit was constructed and preliminary functional testing has been completed. The final circuit board fabrication and wire wrapping is presently in progress.

C. Control Panel.

Figure 2 shows the control panel for EMRS. The panel dimensions are 19" x 7" for standard rack mounting.

The heavy arrows on the diagram indicate the direction of RF signal flow.

Light arrows indicate post detection dc levels. The function of each control panel switch and connector is shown in table 1.

(1) CORADCOM-76-0332-6, ELECTROMAGNETIC RADIATION SYSTEM (EMRS) FOR SUSCEPTIBILITY TESTING, JULY 1978.

IV. FUTURE PLANS.

During the next report period, the following developments are anticipated:

1. Receipt of tracking filters for the 30 to 60 MHz, 1 to 2.1 GHz, 2.1 to 4 GHz, and 12.4 - 18 GHz bands.
2. Final assembly of EMRS system and system check out.
3. Begin formal testing according to the EMRS system test plan dated July 1978.

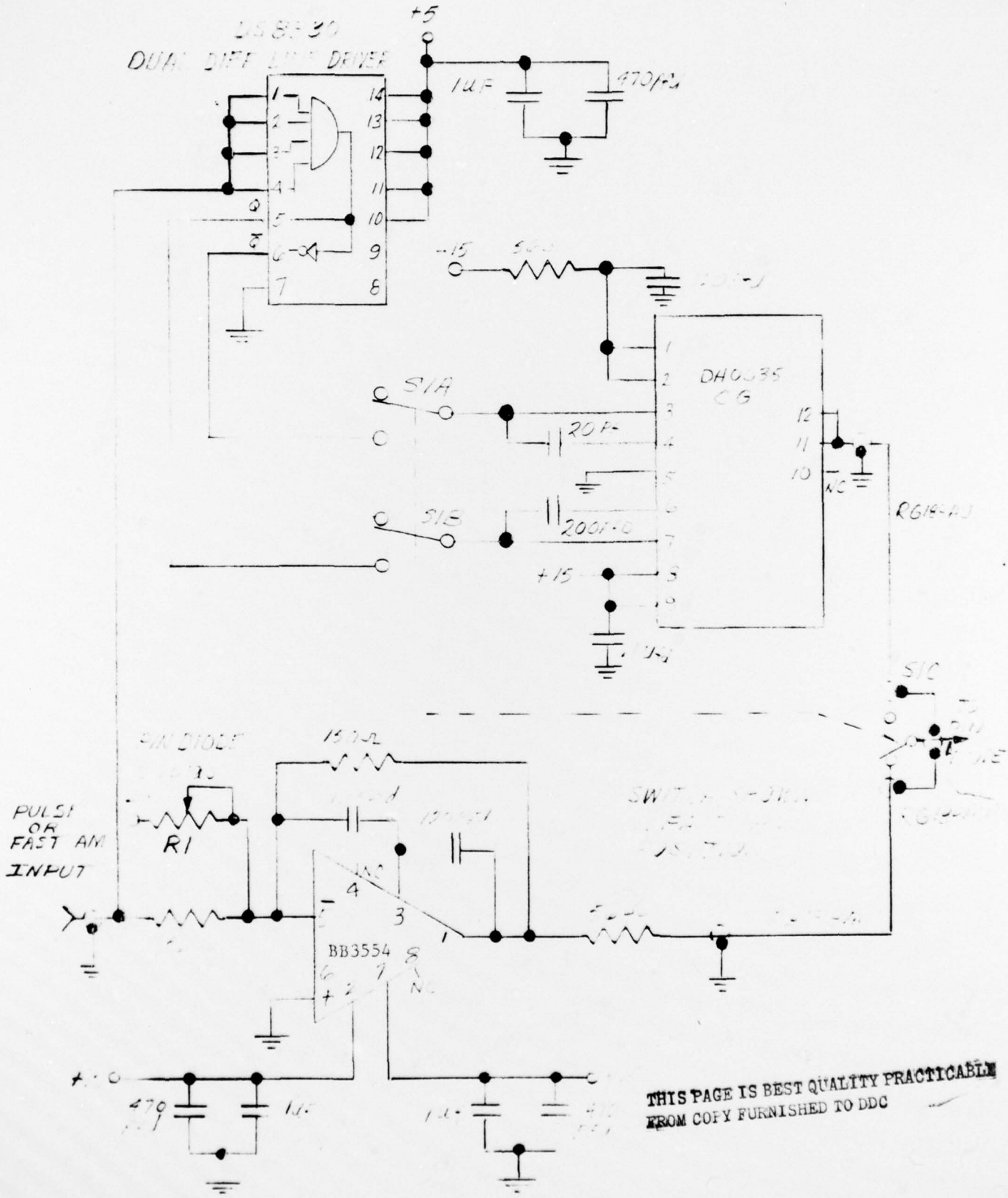

Figure 1. Pulse and Fast AM Modulation Circuit

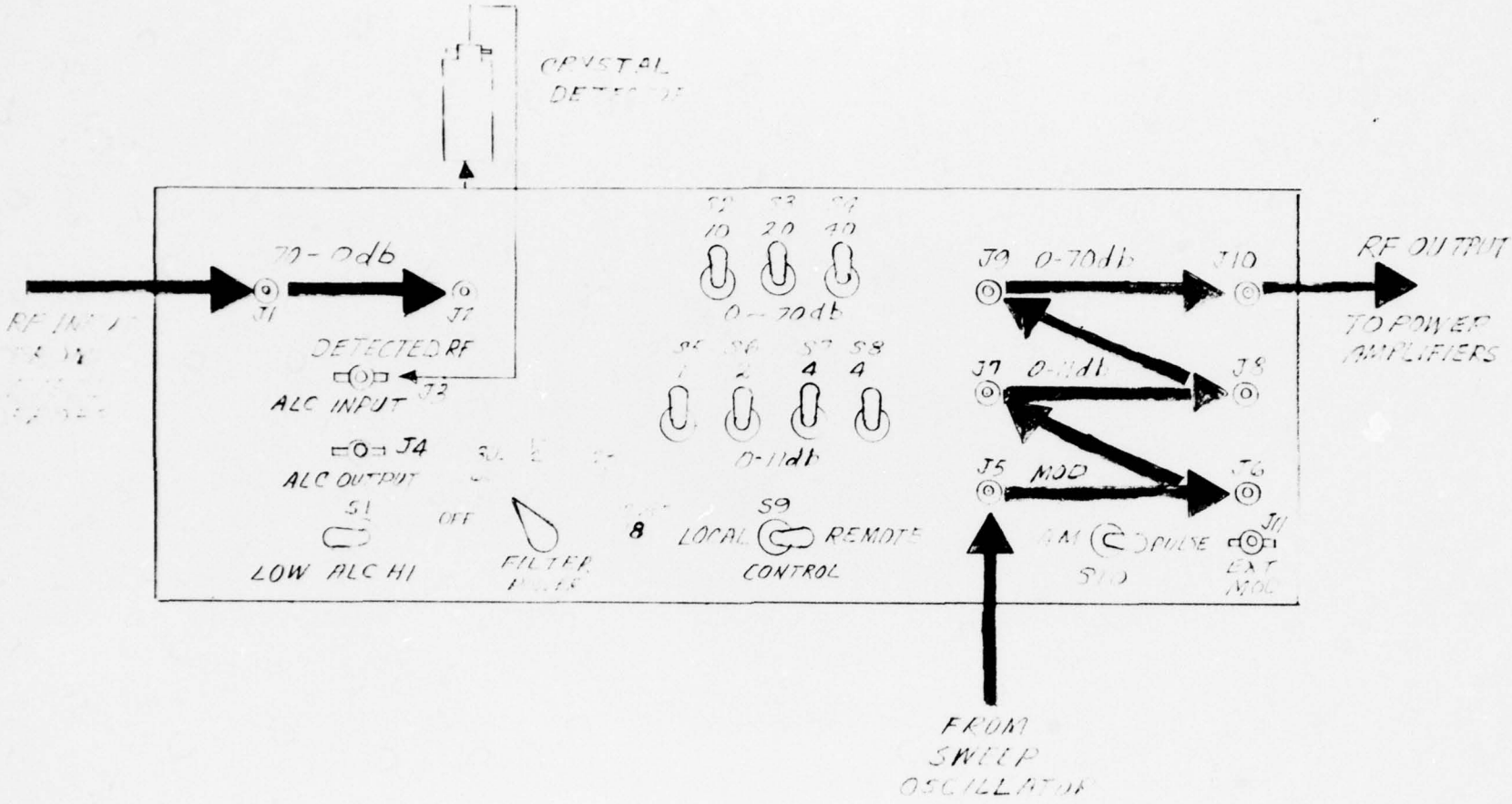

Figure 2. EMRS Control Panel

TABLE 1

Designation	Function	Connection/Switch Type
J1	RF input from field probe	N-F
J2	Attenuated (70 to 0 db) RF input from field probe. Outputs to crystal detector	N-F
J3	Accepts detected RF from crystal detector. Input to automatic leveling control (ALC) amplifier/filter.	BNC-F
J4	Output of ALC amplifier/filter. Outputs to sweep oscillator external ALC input.	BNC-F
J5	RF input to PIN diode modulator. Accepts RF signal from sweep oscillator.	N-F
J6	Modulated RF output	N-F
J7	RF input to (0 to 11 db) attenuator.	N-F
J8	Attenuated (0 to 11 db) RF output.	N-F
J9	RF input to 0 to 70 db attenuator.	
J10	Attenuated (0 to 70 db) RF output.	N-F
J11	External modulation input.	BNC-F
S1	Selects LOW or HI ALC gain	SPDT
S2-S8	Selects RF attenuation from 0 to 81 db	SPDT
S9	Selects local or remote (computer) control of control panel functions	SPDT
S10	Selects fast AM or pulse modulation	3PDT
S11	Selects power supply for tracking filters	5 position rotary

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